

Standard Operating Procedure for Zooplankton Sample Collection and Preservation

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1.0 Scope and Application

This standard operating procedure describes the sampling operations and the preservation methods for open lake zooplankton samples taken for the GLNPO Great Lakes surveys.

2.0 Summary of Method

Samples are taken using a plankton tow net that is maneuvered using a winch on the starboard side of the rear work area of the R.V. Lake Guardian. The tow net, with a screened sample bucket attached to the end, is lowered to the desired depth, and raised at a constant, slow speed to collect the sample. Once the net is lifted out of the water, it is rinsed from the outside to free organisms from the side of the net, and to concentrate them into the sample bucket. The sample is transferred to a sample container, the organisms are narcotized and preserved. The samples are brought back to the CRL for analysis.

3.0 Safety and Waste Handling

Formaldehyde is a known carcinogen. During the preservation of samples, the formalin should be dispensed under a hood, using gloves and safety glasses.

4.0 Equipment and Supplies

Plankton tow net 64 μm pore size (#25).
Tow net sample bucket with a 61 μm pore size metal screen.
Flowmeter
Weights 10-20 lbs.
Safety line for sample bucket
Lines for attaching weights
Garden hose with attached water source
Spray bottle
Soda water (Club soda)
Formalin (37% formaldehyde)
500 mL plastic sample bottles
Repipettor with 10 mL delivery capability
Graduated cylinder 50 - 100 mL capacity
Waterproof notebook
CDT

5.0 Sample Depth

Sample tows are generally taken from a depth of 20 meters from the water surface (integrated sample). In waters which are shallower than 20 meters, (Western basin of L. Erie) samples (B-1 sample) are collected from 1 meter above the bottom to the surface. In cases such as this, only a B-1 sample will be taken. At Master stations, duplicate tows are taken.

Note: During each survey season, when calm weather permits, the flowmeter should be calibrated by repeatedly lowering it to 20 meters in very calm seas, and recording the reading. This is performed using just the flowmeter with the accompanying support ring (no net). This should be repeated 20 times. The mean value of these 20 readings divided by the depth will be used to calculate filtering efficiency for sample tows.

Note: If a CDT instrument is being used on the tow line, real depth will be used for sampling instead of line length. In this case, the distance from the depth meter on the CDT to the rim of the plankton net (about 1 meter) must be measured and that distance will taken into account when reading the CDT depth. Subtract this distance from the sample depth, and have the winch operator stop the winch when the CDT indicates the corrected depth.

6.0 Sampling Procedure

- 6.1 Once on station, obtain the bottom depth from the rosette information provided in the wet lab.
- 6.2 Convert the bottom depth into meters by means of a conversion table, or $3.281 \text{ ft} = 1 \text{ M}$.
- 6.3 Screw on the sample bucket so that it becomes snug. Do not over tighten. Attach the net to the winch line. Attach the safety line from the winch cable to the net ring.
- 6.4 Open the hatch on the flowmeter and reset all the dials to zero.
- 6.5 Inform the winch operator the depth of the sample to be taken.
- 6.6 Have the winch operator lower the net to the desired depth. The zero point for the depth on the winch is when the top of the net is at the water surface. Make sure that the tow line is as vertical as possible. If the angle exceeds 30° , repeat the tow using the CTD, and if needed, contact the bridge to have the ship re-positioned.

Note: If weather conditions continually produce drifting net tows, inform the EPA Chief Scientist.

- 6.7 The net should be raised at a constant speed until the rim is above the water. Refer to the factory calibration for each flowmeter as each one has an optimal speed at which it functions most efficiently. Currently, the winch speed used for flowmeter #3478 is on setting "8" and corresponds to approximately 0.60 m/s. It is very important to complete each zooplankton tow using this setting. When the flowmeter or winch is eventually replaced, a new speed will have to be determined.
- 6.8 Do not interrupt the tow by stopping and starting the which while the net is being raised to the surface. If this occurs, repeat the tow.
- 6.9 Rinse the net down gently with the garden hose from the outside to wash all of the organisms off of the side of the net. Detach the sample bucket. Rinse the screening and the sides of the bucket with the spray bottle or very gently with the garden hose to collect all of the sample into the 500 mL sample container which has been appropriately labeled. Double check the labels on the bottles to make sure that the caps and bottle labels match, and that the sample is going into the appropriate

bottle.

- 6.10 Record the date, station, flowmeter reading, depth of tow, and angle of tow into the waterproof notebook while on deck.
- 6.11 In the biology lab, pour 20 mL of soda water into the sample to narcotize the organisms. Let sit for 30 minutes. Adjust the volume of the sample, using distilled water, to accommodate 20 mL of formalin solution. Once the formalin has been added, the container should be nearly full. If the container is *too* full to add the correct amount of formalin, allow the sample to sit for at least 1 hour after addition of the soda water. Using a pipette covered with netting, draw off enough solution in the top portion of the sample to accommodate the formalin. Store the sample in the area designated by the sample coordinator.
- 6.12 Transfer the recorded information taken during the sampling process from the field notebook to the *Zooplankton Field Collection Sheet* in the biology lab on the ship immediately after the sample is put into the cooler. The following information should be entered on each sheet: Lake, Survey, Date, Flowmeter #. The following information should be entered for each sample taken: Station, Sample type (INT, B-1), Angle, Meter start, Meter reading end, Station depth.

